A simple theory of capillary-gravity wave turbulence.

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Employing a recentl y proposed "multi-wave interaction" theory [JFM, 243, 623-635], inertial spectra of capillary-gravity waves are derived. This case is characterized by a rather high degree of nonlinearity and a complicated dispersion law. The absence of scale invariance makes this and some other problems of wave turbulence (e.g., nonlinear inertia-gravity waves) intractable by small-perturbation techniques, even in the weak-turbulence limit. The analytical solution obtained in the present work for an arbitrary degree of non-linearity is shown to be in a reasonable agreement with experimental data. The theory successfully explains dependence of the wave spectrum on wind input and describes the accelerated roll-off of the spectral density function in the narrow sub-range separating scale-invariant regimes of purely gravity and capillary waves, while the appropriate (long- and short-wave) limits yield power-laws corresponding to the Zakharov-Filonenko and Phillips spectra.

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